CLAIMS

1. A disk memory device comprising:

a command history information storage means for holding historic information of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host device;

a continuity detection means for detecting a direction along which prereading of data is to be carried out, on the basis of the read commands stored in the command history information storage means;

a prereading area decision means for deciding the position and size of data to be preread on the disk memory medium, on the basis of the read commands and the data prereading direction detected by the continuity detection means;

a cache memory for holding preread data; and

a prereading startup means for reading the data to be preread, which is decided by the prereading area decision means, from the disk memory medium, and storing the data in the cache memory.

2. A disk memory device comprising:

a command history information storage means for holding historic information of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host device;

a continuity detection means for detecting an area-to-area distance which is an interval of data to be preread, on the basis of the read commands stored in the command history information storage means;

a prereading rule holding means for holding prereading rules for performing prereading of data;

a prereading rule decision means for deciding a prereading rule to be used for prereading of data, on the basis of the read commands, the area-to-area distance detected by the continuity detection means, and the prereading rules held by the prereading rule holding means;

a prereading area decision means for deciding the position and size of data to be preread on the disk memory medium, on the basis of the prereading rule decided by the prereading rule decision means;

a cache memory for holding preread data; and

a prereading startup means for reading the data to be preread, which is decided by the prereading area decision means, from the disk memory medium, and storing the data into the cache memory.

3. A disk memory device comprising:

a command history information storage means for holding historic information of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host device;

a continuity detection means for detecting a direction along which prereading of data is to be carried out, and an area-to-area distance which is an interval of data to be preread, on the basis of the read commands stored in the command history information storage means;

a prereading rule holding means for holding prereading rules for performing prereading of data;

a prereading rule decision means for deciding a prereading rule to be used for prereading of data, on the basis of the read commands, the data prereading direction and the area-to-area distance which are detected by the continuity detection means, and the prereading rules held by the prereading rule holding means;

a prereading area decision means for deciding the position and size of data to be preread on the disk memory medium, on the basis of the prereading rule decided by the prereading rule decision means;

a cache memory for holding preread data; and

a prereading startup means for reading the data to be preread, which is decided by the prereading area decision means, from the disk memory medium, and storing the data into the cache memory.

4. A disk memory device as defined in Claim 2 or Claim 3, wherein

the prereading rule holding means holds a plurality of

prereading rules; and

when there are a prereading rule decided by the prereading rule decision means and a prereading rule which has been employed immediately before the decided prereading rule and, further, the prereading directions of these prereading rules are the same, the prereading area decision means decides the position and size of data to be preread on the disk memory medium by employing both of the prereading rules in combination.

5. A disk memory device as defined in any of Claims 1 to 4, further comprising:

a cache memory pointer holding means for holding an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored; and

a prereading startup judgement means for judging whether or not prereading of data is to be performed to leave at least several blocks of data which have already been transferred to the host device, on the cache memory, by employing the under-transfer address and the next preread data storage start address which are held by the cache memory pointer holding means.

6. A disk memory device as defined in any of Claims 1, 3 to 5, wherein:

the prereading startup means stores a plurality of preread data, which have successively been read out in the backward direction, successively into a backward-direction area in an address space on the cache memory.

7. A data prereading method comprising:

a continuity detection step of detecting a direction along which prereading of data is to be carried out, on the basis of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host device;

a prereading area decision step of deciding the position and size of data to be preread on the disk memory medium, on the basis of the read commands and the data prereading direction detected in the continuity detection step; and

a prereading startup step of reading the data to be preread, which is decided in the prereading area decision step, from the disk memory medium, and storing the preread data in a cache memory which is a storage area for the preread data.

8. A data prereading method comprising:

a continuity detection step of detecting an area-to-area distance which is an interval of data to be preread, on the basis of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host

device;

a prereading rule decision step of deciding a prereading rule to be used for prereading of data, on the basis of the read commands, the area-to-area distance detected in the continuity detection step, and prereading rules held by a prereading rule holding means which holds prereading rules for performing prereading of data;

a prereading area decision step of deciding the position and size of data to be preread on the disk memory medium, on the basis of the prereading rule to be used for prereading of data, which is decided in the prereading rule decision step; and

a prereading startup step of reading the data to be preread corresponding to the position and size on the disk memory medium which are decided in the prereading area decision step, and storing the preread data into a cache memory for holding the preread data.

9.   A data prereading method comprising:

a continuity detection step of detecting a direction along which prereading of data is to be carried out and an area-to-area distance which is an interval of data to be preread, on the basis of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host device;

a prereading rule decision step of deciding a prereading rule

to be used for prereading of data, on the basis of the read

commands, the data prereading direction and the area-to-area

distance which are detected in the continuity detection step, and

prereading rules held by a prereading rule holding means which

holds prereading rules for performing prereading of data;

a prereading area decision step of deciding the position and

size of data to be preread on the disk memory medium, on the

basis of the prereading rule to be used for prereading of data,

which is decided in the prereading rule decision step; and

a prereading startup step of reading the data to be preread

corresponding to the position and size on the disk memory medium

which are decided in the prereading area decision step, and

storing the preread data into a cache memory which is a storage

area for the preread data.

10. A data prereading method as defined in Claim 8 or Claim 9,

wherein:

when there are a prereading rule decided in the prereading

rule decision step and a prereading rule which has been employed

immediately before the decided prereading rule and, further, the

prereading directions of these prereading rules are the same, the

prereading area decision step decides the position and size of

data to be preread on the disk memory medium by employing both of

the prereading rules in combination.

11. A data prereading method as defined in any of Claims 7 to 10, further comprising:

a prereading startup judgement step of judging whether or not prereading of data is to be performed to leave, on the cache memory, at least several blocks of data which have already been transferred to the host device, by employing an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored.

12. A data prereading method as defined in any of Claims 7, 9 to 11, wherein:

the prereading startup step stores a plurality of preread data which have been successively read out in the backward direction, successively into a backward-direction area in an address space on the cache memory.

13. A computer-readable recording medium on which a program for making a computer execute a data prereading method is recorded, said data prereading method comprising:

a continuity detection step of detecting a direction along which prereading of data is to be carried out, on the basis of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host

device;

a prereading area decision step of deciding the position and size of data to be preread on the disk memory medium, on the basis of the read commands and the data prereading direction detected in the continuity detection step; and

a prereading startup step of reading the data to be preread, which is decided in the prereading area decision step, from the disk memory medium, and storing the preread data in a cache memory which is a storage area for the preread data.

14.   A computer-readable recording medium on which a program for making a computer execute a data prereading method is recorded, said data prereading method comprising:

a continuity detection step of detecting an area-to-area distance which is an interval of data to be preread, on the basis of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host device;

a prereading rule decision step of deciding a prereading rule to be used for prereading of data, on the basis of the read commands, the area-to-area distance detected in the continuity detection step, and prereading rules held by a prereading rule holding means which holds prereading rules for performing prereading of data;

a prereading area decision step of deciding the position and

size of data to be preread on the disk memory medium, on the
basis of the prereading rule to be used for prereading of data,
which is decided in the prereading rule decision step; and

a prereading startup step of reading the data to be preread
corresponding to the position and size on the disk memory medium
which are decided in the prereading area decision step, and
storing the preread data into a cache memory for holding the
preread data.

15. A computer-readable recording medium on which a program for
making a computer execute a data prereading method is recorded,
said data prereading method comprising:

a continuity detection step of detecting a direction along
which prereading of data is to be carried out and an area-to-area
distance which is an interval of data to be preread, on the basis
of read commands as information for reading data recorded on a
disk memory medium, which read commands are received from a host
device;

a prereading rule decision step of deciding a prereading rule
to be used for prereading of data, on the basis of the read
commands, the data prereading direction and the area-to-area
distance which are detected in the continuity detection step, and
prereading rules held by a prereading rule holding means which
holds prereading rules for performing prereading of data;

a prereading area decision step of deciding the position and

size of data to be preread on the disk memory medium, on the

basis of the prereading rule to be used for prereading of data,

which is decided in the prereading rule decision step; and

a prereading startup step of reading the data to be preread

corresponding to the position and size on the disk memory medium

which are decided in the prereading area decision step, and

storing the preread data into a cache memory which is a storage

area for the preread data.

16. A recording medium as defined in Claim 14 or Claim 15,

wherein:

in the data prereading method, when there are a prereading

rule decided in the prereading rule decision step and a

prereading rule which has been employed immediately before the

decided prereading rule and, further, the prereading directions

of these prereading rules are the same, the prereading area

decision step decides the position and size of data to be preread

on the disk memory medium by employing both of the prereading

rules in combination.

17. A recording medium as defined in any of Claims 13 to 16,

wherein the data prereading method further comprises:

a prereading startup judgement step of judging whether or not

prereading of data is to be performed to leave, on the cache

memory, at least several blocks of data which have already been

transferred to the host device, by employing an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored.

18.   A data prereading method as defined in any of Claims 13, 15 to 17, wherein:

in the data prereading method, the prereading startup step stores a plurality of preread data which have been successively read out in the backward direction, successively into a backward-direction area in an address space on the cache memory.